AMENDMENTS TO THE SPECIFICATION

IN THE SPECIFICATION:

The specification has been amended as follows:

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Before line 1 of the specification, the following new paragraph has been inserted:

This Nonprovisional application claims priority under 35 U.S.C. § 119(a) on Patent Application No(s). 2002-240129 filed in Japan on August 28, 2002, the entire contents of which are hereby incorporated by reference.

Before paragraph [0002], the heading has been amended as follows:

~~Description of the Prior Art~~Background of the Invention

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[0010] To achieve the above object, according to the present invention, ~~A frequency~~ a frequency conversion apparatus has a high-frequency amplifier for amplifying an input high-frequency signal, a mixer for mixing the output signal of the high-frequency amplifier with a local oscillation signal, a filter for restricting the band of the output signal of the mixer to permit passage of only components within a predetermined band, and a variable filter provided between the high-frequency

amplifier and the mixer and having a controllable cut-off frequency. Here, the cut-off frequency of the variable filter is so controlled as to vary with the reception channel signal.

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Before paragraph [0012], the heading "**DESCRIPTION OF THE PREFERRED EMBODIMENTS**" has been amended as follows:

DESCRIPTION OF THE ~~PREFERRED EMBODIMENTS~~INVENTION

[0013] First, a first embodiment of the invention will be described. Fig. 1 is a block diagram of the double-conversion tuner apparatus of the first embodiment of the invention. As shown in this figure, the double-conversion tuner apparatus of this embodiment includes a first band-pass filter 10 (hereinafter referred to as the first BPF 10) that restricts the band of an RF signal fed in via a terminal IN so as to permit passage of only desired frequency components, an attenuator 11 (hereinafter referred to as the ATT 11) that attenuates the output RF signal of the first band-pass filter 10, a high-frequency amplifier 12 (hereinafter referred to as the RF amplifier 12) that ~~amplifiers~~ amplifies the output RF signal of the attenuator 11, a first local oscillator 13 that generates a first local oscillation signal, a first mixer that mixes the output RF signal of the RF amplifier 12 with the first local oscillation signal to generate a first IF signal, a

second band-pass filter 15 (hereinafter referred to as the second BPF 15) that restricts the band of the first IF signal to remove unwanted signal components therefrom, a second local oscillator 16 that generates a second local oscillation signal, a second mixer 17 that mixes the output IF signal of the second BPF 15 with the second local oscillation signal to generate a second IF signal, a third band-pass filter 18 (hereinafter referred to as the third BPF 18) that restricts the band of the second IF signal to remove unwanted signal components therefrom, and an intermediate-frequency amplifier 19 (hereinafter referred to as the IF amplifier 19) that amplifiers the output IF signal of the third BPF 18 and then feeds it to a terminal OUT. Moreover, between the RF amplifier 12 and the first mixer 14, there is provided a variable low-pass filter "a" (hereinafter referred to as the variable LPF "a") of which the cut-off frequency is controllable.

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[0016] Next, a second embodiment of the invention will be described. Fig. 3 is a block diagram of the double-conversion tuner apparatus of the second embodiment of the invention. Here, such circuit blocks ~~as find their counterparts~~which are counterparts of those in the first embodiment are identified with the same reference numerals and symbols as in Fig. 1, and

their explanations will not be repeated; that is, the following description concentrates on the features characterizing this embodiment.

[0018] In the double-conversion tuner apparatus configured as described above, a reception signal that has passed through the variable BPF "b" is mixed with the first local oscillation signal in the first mixer 14. Here, the cut-off frequency of the variable BPF "b" is so controlled as to vary with the reception channel signal, and therefore the desired signal of the reception channel is permitted to pass through the variable BPF "b", and is then converted into the first IF signal. By contrast, the signal of a channel other than the reception channel is shut off by the variable BPF "b", and thus cannot reach the first mixer 14. In this way, in this embodiment, it is also possible to ~~suppress the generation~~ suppress generation of unwanted signals (having frequencies fa ± fb, 2fa ± fb, etc.) due to high-order distortion occurring among the signals of other channels (having frequencies fa and fb). Thus, as compared with in the first embodiment described earlier, it is possible to further reduce the leakage of unwanted signals to the terminal IN.

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[0019] Next, a third embodiment of the invention will be described. Fig. 4 is a block diagram of the double-conversion tuner apparatus of the third embodiment of the invention. Here, such circuit blocks ~~as find their counterparts~~which are counterparts of those in the second embodiment are identified with the same reference numerals and symbols as in Fig. 3, and their explanations will not be repeated; that is, the following description concentrates on the features characterizing this embodiment.

[0020] As shown in Fig. 4, in the double-conversion tuner apparatus of this embodiment, between the RF amplifier 12 and the first mixer 14, there are provided, instead of the variable BPF "b" used in the second embodiment, a variable low-pass filter "c1" and a variable high-pass filter "c2" (hereinafter referred to as the variable LPF "c1" and the variable HPF "c2," respectively) of which the cut-off frequencies are controllable. This configuration, as compared with one including a single variable band-pass filter, makes it ~~easy~~ easier to secure a wide band. Thus, it is possible to prevent mismatch between the reception signal and the pass band of the filter without requiring the filter to have an unduly high degree of followability to the reception signal.

[0021] Next, a fourth embodiment of the invention will be described. Fig. 5 is a block diagram of the double-conversion tuner apparatus of the fourth embodiment of the invention. Here, such circuit blocks ~~as find their counterparts~~which are counterparts of those in the first embodiment are identified with the same reference numerals and symbols as in Fig. 1, and their explanations will not be repeated; that is, the following description concentrates on the features characterizing this embodiment.

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The following new paragraph has been added:

[0026] The invention being thus described, it will be obvious that the same may be varied in many ways. Such variations are not to be regarded as a departure from the spirit and scope of the invention, and all such modifications as would be obvious to one skilled in the art are intended to be included within the scope of the following claims.